

CLAIMS

1. A friction material facing comprising:
 - a material facing having a first edge, a second edge, a first surface and a second surface;
 - a plurality of spaced first channels extending from said first edge toward said second edge a predetermined distance;
 - at least one of said plurality of spaced first channels extending between said first surface and said second surface through said material facing a first predetermined depth; and
 - said material facing further comprising a second channel defining a predetermined second channel area extending between said first surface and said second surface a second predetermined depth, said second channel enabling fluid communication between a first area associated with a first side with a second area associated with a second side.
2. The friction material facing as recited in claim 1 wherein said second predetermined depth is less than one hundred percent of a distance between said first surface and said second surface.

3. The friction material facing as recited in claim 1 wherein said first area is associated with said at least one plurality of spaced first channels, said predetermined second channel area enables fluid to communicate from said at least one of said plurality of spaced first channels to said second area associated with said second edge.
4. The friction material facing as recited in claim 2 wherein said second channel being coupled to said at least one of said plurality of spaced first channels and enabling fluid to communicate from said first area to said second area.
5. The friction material facing as recited in claim 1 wherein said first predetermined depth traverses the entire distance between said first surface and said second surface.
6. The friction material facing as recited in claim 1 wherein said at least of said plurality of spaced first channels comprises a first wall situated in generally opposed relation to a second wall and a connector portion between said first wall and said second wall, said connector portion comprising a surface that cooperates with said first wall and said second wall to define said second channel.
7. The friction material facing as recited in claim 6 wherein said surface is planar and parallel to said first surface.
8. The friction material facing as recited in claim 6 wherein said surface is generally U-shaped in cross section.

9. The friction material facing as recited in claim 6 wherein said surface is generally V-shaped in cross section.

10. The friction material facing as recited in claim 6 wherein said first wall and said second wall are not perpendicular to an imaginary plane defined by said planar surface.

11. The friction material facing as recited in claim 6 wherein said surface is not perpendicular to one of said first edge or said second edge.

12. The friction material facing as recited in claim 1 wherein each of said plurality of spaced first channels comprising a first depth that extends between said first surface and said second surface through said material facing and a second depth that extends through said first surface to provide said second channel.

13. The friction material facing as recited in claim 6 wherein each of said plurality of spaced first channels comprising a first depth that extends through said material facing and a second depth that extends only partly through said first surface and said second surface to provide said second channel.

14. The friction material facing as recited in claim 1 wherein every other of said plurality of spaced first channels comprising a first depth that extends through said material facing and a second depth that extends a predetermined depth distance between said first surface and said second surface to provide said second channel.

15. The friction material facing as recited in claim 6 wherein every other of said plurality of spaced first channels comprising a first depth that extends through said material facing and a second depth that extends a predetermined depth distance between said first surface and said second surface to provide said second channel.

16. The friction material facing as recited in claim 6 wherein each of said plurality of spaced first channels comprises said connector.

17. The friction material facing as recited in claim 16 wherein each of said connectors is associated with said second edge.

18. The friction material facing as recited in claim 16 wherein a first plurality of said connectors is associated with said first side and a second plurality of said connectors is associated with said second side.

19. The friction material facing as recited in claim 16 wherein each of said connectors is lies between said first and second edges.

20. The friction material facing as recited in claim 19 wherein each of said connectors is associated with said first surface.

21. The friction material facing as recited in claim 19 wherein each of said connectors is associated with said second surface.

22. The friction material facing as recited in claim 14 wherein said material facing further comprises at least one second channel comprising said second predetermined depth between said first edge and said second edge.

23. The friction material facing as recited in claim 20 wherein said at least one second channel is situated between a first of said plurality of spaced first channels and a second of said plurality of spaced first channels.

24. The friction material facing as recited in claim 14 wherein said material facing comprises a plurality of second channels each of which extends between said first edge and said second edge and are not in fluid communication with said at least one of said plurality of spaced first channels.

25. The friction material facing as recited in claim 14 wherein said material facing comprises at least one second channel in fluid communication with a plurality of said plurality of spaced first channels.

26. The friction material facing as recited in claim 1 wherein said material facing comprises a plurality of friction areas comprising a predetermined shape and separated by said second channel.

27. The friction material facing as recited in claim 26 wherein said predetermined shape defines a generally straight edge associated with said first area.

28. The friction material facing as recited in claim 26 wherein said predetermined shape defines a generally curved edge associated with said first area.

29. The friction material facing as recited in claim 26 wherein said predetermined shape defines a multi-sided edge associated with said first area.

30. The friction material facing as recited in claim 1 wherein said second channel is machined in said material facing.

31. The friction material facing as recited in claim 1 wherein said second channel is formed by blanking said material facing.

32. The friction material facing as recited in claim 1 wherein said material facing is cut from a web of material facing said second channel formed therein.

33. The friction material facing as recited in claim 1 wherein said material facing is cut from a web of material having said second channel formed therein.

34. A friction material for use on a friction material support, said friction material comprising:

- a first edge associated with a first area;

- a second edge associated with a second area;

- a friction surface for engaging a friction component; and

- an adhesive surface for adhering said friction material onto said friction material support;

- a plurality of spaced apertures having an opening associated with said first edge, at least a portion of each of said plurality of spaced apertures defining an first channel in said friction material for receiving fluid; and

- at least one second channel also capable of receiving fluid, said at least one second channel having a second channel depth that is less than a thickness of said material.

35. The friction material as recited in claim 34 wherein said at least one second channel enables fluid to communicate from said at least one of said plurality of spaced first channels to said second area associated with said second edge.

36. The friction material as recited in claim 35 wherein said friction material comprises a plurality of second channels associated with said plurality of spaced apertures to enable fluid to communicate from said first area to said second area.

37. The friction material as recited in claim 34 wherein each of said plurality of first channels comprises a first channel depth that is greater than said second channel depth.

38. The friction material as recited in claim 34 wherein each of said plurality of spaced apertures comprises a first wall situated in generally opposed relation to a second wall and a connector portion between said first wall and said second wall, said connector portion comprising a surface that cooperates with said first wall and said second wall to define said second channel.

39. The friction material as recited in claim 38 wherein said surface is planar and parallel to said first surface.

40. The friction material as recited in claim 38 wherein said surface is generally U-shaped in cross section.

41. The friction material as recited in claim 38 wherein said surface is generally V-shaped in cross section.

42. The friction material as recited in claim 38 wherein said first wall and said second wall are not perpendicular to an imaginary plane defined by said planar surface.

43. The friction material as recited in claim 34 wherein said at least one second channel is in fluid communication with at least one of said plurality of spaced apertures.

44. The friction material as recited in claim 34 wherein said at least one second channel is in fluid communication with each of said plurality of spaced apertures.

45. The friction material as recited in claim 34 wherein said friction material comprises a plurality of second channels in fluid communication with said plurality of spaced apertures, respectively, to permit fluid to pass from said first area, through said plurality of spaced apertures, and into said second area.

46. The friction member as recited in claim 45 wherein at least some of said plurality of spaced apertures open to said first edge and at least some of said plurality of apertures open to said second edge.

47. The friction member as recited in claim 46 wherein said plurality of spaced apertures open to a first edge and every other of said at least some of said plurality of apertures open to said second edge.

48. The friction material as recited in claim 34 wherein each of said plurality of spaced apertures comprises a first depth that extends through said material and a second depth that extends only partly through said first surface and said second surface to provide said plurality of second channels.

49. The friction material as recited in claim 34 wherein every other of said plurality of spaced apertures comprising a first depth that extends through said material and a second depth that extends a predetermined depth distance between said first surface and said second surface to provide said plurality of second channels.

50. The friction material as recited in claim 38 wherein every other of said plurality of spaced apertures comprising a first depth that extends through said material and a second depth that extends a predetermined depth distance between said first surface and said second surface to provide said plurality of second channels.

51. The friction material as recited in claim 38 wherein each of said connectors is associated with said second edge.

52. The friction material as recited in claim 38 wherein each of said connectors comprises a thickness of less than half of a thickness of said friction material facing.

53. The friction material as recited in claim 52 wherein a first plurality of said connectors is associated with said first side and a second plurality of said connectors is associated with said second side.

54. The friction material as recited in claim 38 wherein each of said connectors is lies between said first and second edges.

55. The friction material as recited in claim 38 wherein each of said connectors is associated with said first surface.

56. The friction material as recited in claim 38 wherein each of said connectors is associated with said second surface.

57. The friction material as recited in claim 34 wherein said material further comprises a second plurality of second channels comprising each comprising said second predetermined depth between said first edge and said second edge.

58. The friction material as recited in claim 57 wherein at least one of said second plurality of second channels is situated between a first one of said plurality of spaced apertures and a second one of said plurality of spaced apertures.

59. The friction material as recited in claim 34 wherein said material comprises a second plurality of second channels each of which extends between said first edge and said second edge and are not in fluid communication with said at least one of said plurality of spaced apertures.

60. The friction material as recited in claim 34 wherein said material comprises a plurality of friction areas defined by said comprising a predetermined shape and separated by said second channel.

61. The friction material as recited in claim 60 wherein said predetermined shape defines a generally straight edge associated with said first area.

62. The friction material as recited in claim 60 wherein said predetermined shape defines a generally curved edge associated with said first area.

63. The friction material as recited in claim 60 wherein said predetermined shape defines multiple edges associated with said first area to define a chevron shape.

64. The friction material as recited in claim 34 wherein each of said plurality of second channels is machined in said material.

65. The friction material as recited in claim 34 wherein each of said plurality of second channels is formed by blanking said material.

66. The friction material as recited in claim 34 wherein said material is cut from a web of material having said plurality of second channels formed therein.

67. The friction material as recited in claim 34 wherein said material is cut from a web of material having said second channel formed therein.

68. A friction material facing comprising:
a friction material;
a plurality of first channels in said friction material; and
a plurality of second channels in said friction material, said plurality of second channels and said plurality of first channels being capable of receiving a fluid.

69. The friction material facing as recited in claim 68 wherein said plurality of first channels are in fluid communication with said plurality of second channels, respectively.

70. The friction material facing as recited in claim 68 wherein each of said plurality of first channels comprises an open end and a closed end, at least one of said plurality of second channels being provided in said closed end of each of said plurality of apertures.

71. The friction material facing as recited in claim 68 wherein said plurality of first channels each comprise a first channel depth and said plurality of second channels each comprise a second channel depth, said first channel depth being greater than said second channel depth.

72. The friction material facing as recited in claim 68 wherein said plurality of first channels each extend through said friction material.

73. The friction material facing as recited in claim 71 wherein said plurality of first channels each extend through said friction material and have a first channel length that is less than a material width defined by said first edge and said second edge.

74. The friction material facing as recited in claim 73 wherein each of said plurality of second channels comprises a second channel length that generally corresponds to said material width.

75. The friction material facing as recited in claim 73 wherein each of said plurality of second channels comprises a second channel length that is less than said material width.

76. The friction material facing as recited in claim 73 wherein each of said plurality of second channels comprises a second channel length that is less than said first channel length.

77. The friction material facing as recited in claim 73 wherein at least one of said plurality of second channels comprises a second channel length that is less than said material width.

78. The friction material facing as recited in claim 68 wherein said plurality of first channels are stamped and said plurality of second channels are formed by blanking.

79. The friction material facing as recited in claim 75 wherein said first channel length is greater than 50 percent of said material width.

80. The friction material facing as recited in claim 76 wherein said first channel length is greater than 50 percent of said material width and said second channel length is less than said first channel length.

81. A friction member for use in a transmission assembly, said friction member comprising:

- a metal support ring;

- a friction material;

- an adhesive for securing said friction material onto said metal support ring;

- said friction material comprising:

 - a first edge associated with a first area;

 - a second edge associated with a second area;

 - a friction surface for engaging a friction component; and

 - an adhesive surface for adhering said friction material onto said friction material support;

 - a plurality of spaced apertures defining an open first channel in said friction material for receiving fluid; and

 - at least one second channel also capable of receiving fluid, said at least one second channel having a second channel depth that is less than a thickness of said material.

82. The friction member as recited in claim 81 wherein said at least one second channel enables fluid to communicate from said at least one of said plurality of spaced first channels to said second area associated with said second edge.

83. The friction member as recited in claim 82 wherein said friction material comprises a plurality of second channels associated with said plurality of spaced apertures to enable fluid to communicate from said first area to said second area.

84. The friction member as recited in claim 81 wherein each of said plurality of first channels comprises a first channel depth that is greater than said second channel depth.

85. The friction member as recited in claim 81 wherein each of said plurality of spaced apertures comprises a first wall situated in generally opposed relation to a second wall and a connector portion between said first wall and said second wall, said connector portion comprising a surface that cooperates with said first wall and said second wall to define said second channel.

86. The friction member as recited in claim 85 wherein said surface is planar and parallel to said first surface.

87. The friction member as recited in claim 85 wherein said surface is generally U-shaped in cross section.

88. The friction member as recited in claim 84 wherein said surface is generally V-shaped in cross section.

89. The friction member as recited in claim 84 wherein said first wall and said second wall are not perpendicular to an imaginary plane defined by said planar surface.

90. The friction member as recited in claim 81 wherein said at least one second channel is in fluid communication with at least one of said plurality of spaced apertures.

91. The friction member as recited in claim 81 wherein said at least one second channel is in fluid communication with each of said plurality of spaced apertures.

92. The friction member as recited in claim 81 wherein said friction material comprises a plurality of second channels in fluid communication with said plurality of spaced apertures, respectively, to permit fluid to pass from said first area, through said plurality of spaced apertures, and into said second area.

93. The friction member as recited in claim 92 wherein at least some of said plurality of apertures open to said first edge and at least some of said plurality of apertures open to said second edge.

94. The friction member as recited in claim 81 wherein each of said plurality of spaced apertures comprises a first depth that extends through said material and a second depth that extends only partly through said first surface and said second surface to provide said plurality of second channels.

95. The friction member as recited in claim 81 wherein every other of said plurality of spaced apertures comprising a first depth that extends through said material and a second depth that extends a predetermined depth distance between said first surface and said second surface to provide said plurality of second channels.

96. The friction member as recited in claim 85 wherein every other of said plurality of spaced apertures comprising a first depth that extends through said material and a second depth that extends a predetermined depth distance between said first surface and said second surface to provide said plurality of second channels.

97. The friction member as recited in claim 85 wherein each of said connectors is associated with said second edge.

98. The friction member as recited in claim 85 wherein each of said connectors comprises a thickness of less than half of a thickness of said friction material facing.

99. The friction member as recited in claim 98 wherein a first plurality of said connectors is associated with said first side and a second plurality of said connectors is associated with said second side.

100. The friction member as recited in claim 85 wherein each of said connectors is lies between said first and second edges.

101. The friction member as recited in claim 85 wherein each of said connectors is associated with said first surface.

102. The friction member as recited in claim 85 wherein each of said connectors is associated with said second surface.

103. The friction member as recited in claim 81 wherein said material further comprises a second plurality of second channels comprising each comprising said second predetermined depth between said first edge and said second edge.

104. The friction member as recited in claim 103 wherein at least one of said second plurality of second channels is situated between a first one of said plurality of spaced apertures and a second one of said plurality of spaced apertures.

105. The friction member as recited in claim 81 wherein said material comprises a second plurality of second channels each of which extends between said first edge and said second edge and are not in fluid communication with said at least one of said plurality of spaced apertures.

106. The friction member as recited in claim 81 wherein said material comprises a plurality of friction areas defined by said comprising a predetermined shape and separated by said second channel.

107. The friction member as recited in claim 106 wherein said predetermined shape defines a generally straight edge associated with said first area.

108. The friction member as recited in claim 106 wherein said predetermined shape defines a generally curved edge associated with said first area.

109. The friction member as recited in claim 106 wherein said predetermined shape defines multiple edges associated with said first area to define a chevron shape.

110. The friction member as recited in claim 81 wherein each of said plurality of second channels is machined in said material.

111. The friction member as recited in claim 81 wherein each of said plurality of second channels is formed by blanking said material.

112. The friction member as recited in claim 81 wherein said material is cut from a web of material having said plurality of second channels formed therein.

113. The friction member as recited in claim 81 wherein said material is cut from a web of material having said second channel formed therein.

114. The friction member as recited in claim 81 wherein said metal support ring comprises a clutch plate.

115. The friction member as recited in claim 81 wherein said metal support ring comprises a synchronizer ring.

116. The friction member as recited in claim 81 wherein said metal support ring comprises one or more of the following:

- a synchronizer ring;
- a clutch plate;
- a torque converter clutch plate;
- a transmission band; or
- a drum brake lining.

117. A facing material for increasing fluid flow across a surface of said facing material comprising:

a plurality of channels comprising a shallow area and a deep area for permitting fluid to flow from a first area, across a surface of said facing material, to a second area.

118. The facing material as recited in claim 117 wherein said second channel is shallower than said first channel.

119. The facing material as recited in claim 118 wherein said second channel is associated with a second end of said facing material.

120. The facing material as recited in claim 117 wherein said facing material further comprises the step of intermixing said plurality of channels with a second plurality of channels that do not comprise a combination of said shallow area and said deep area.

121. The facing material as recited in claim 120 wherein said second plurality of channels comprise a deep area that does not extend completely across a face of said friction material.